

2004 GALVESTON BAY INVASIVE SPECIES RISK ASSESSMENT
INVASIVE SPECIES SUMMARY

Created by: Environmental Institute of Houston, University of Houston-Clear Lake
and the Houston Advanced Research Center

Common Name: Mexican fruit fly
Latin Name: <i>Anastrepha ludens</i>
Category: Terrestrial Animal
Place of Origin: Mexico
Place of Introduction: “The Mexican fruit fly, <i>Anastrepha ludens</i> (Loew) is a serious pest in many of the regions where it occurs, from northern South America to northern Mexico, penetrating into southern Texas. California, Arizona, and Florida are especially vulnerable to attack by this fly. Occasionally, it has been found in Arizona and southern California. It was detected in Florida in 1934 and 1972, but did not proliferate (http://creatures.ifas.ufl.edu/fruit/tropical/mexican_fruit_fly.htm).”
<p>Date of Introduction: “Seem periodically in the U. S. since at least 1934 (http://creatures.ifas.ufl.edu/fruit/tropical/mexican_fruit_fly.htm).”</p> <p>“A native of Mexico, this pest annually infests fruit groves in the lower Rio Grande Valley area of southern Texas and has entered California periodically. To prevent Mexican fruit flies from causing serious damage to fruit in these States, the U.S. Department of Agriculture's (USDA) Animal and Plant Health Inspection Service (APHIS) operates control and eradication programs in cooperation with State officials. APHIS also cooperates with Mexico in a program to suppress the pest in northern Mexico (http://www.ceris.purdue.edu/napis/pests/ffmx/facts.txt).”</p>
<p>Life History: “The female typically oviposits in citrus and other fruit at the time when the fruit begins to show color. Eggs are usually laid in groups of ten and hatch in six to 12 days. The newly hatched larvae eat and burrow into the pulp of the fruit, taking on the color of their food so that when small they are overlooked easily. Many maggots may be found in a single fruit. When fully grown, the larvae emerge through conspicuous exit holes, usually after the fruit has fallen to the ground, and pupate in the soil. Larval development requires approximately three to four weeks, depending largely upon temperature conditions during these periods of development. The development is more rapid where comparatively higher temperatures prevail, and as a general rule, the shorter the period for fruit maturation the more rapid is the development of the larva.</p> <p>Adults may survive for many months, occasionally almost a full year, and males appear to be able to survive much longer than females, even as much as 16 months (http://creatures.ifas.ufl.edu/fruit/tropical/mexican_fruit_fly.htm).”</p>
<p>Feeding Habits/Diet: “All varieties of citrus except lemons and sour limes are attacked. Grapefruit is the preferred host, with oranges second. Pear, peach, and apple are preferred among the deciduous hosts, and white sapote and mango are preferred among the subtropical fruits. Avocado, while not a preferred host, is attacked. Other hosts include pomegranate, quince, rose apple, cherimoya, custard apple, jinicuil, mamey, and yellow chapote. Still other fruits and vegetables have been infested under laboratory conditions (Baker et al. 1944), including cacti, figs, bananas, tomatoes, peppers, squash and beans (http://creatures.ifas.ufl.edu/fruit/tropical/mexican_fruit_fly.htm).”</p> <p>“In the United States, the Mexican fruit fly attacks apples, apricots, avocados, grapefruit, mangos, nectarines, peaches, pears, plums, prunes, oranges, and tangerines, as well as other fruits (http://www.ceris.purdue.edu/napis/pests/ffmx/facts.txt).”</p>
Habitat: “This species is the only important member of the genus <i>Anastrepha</i> that is subtropical rather than tropical, occupying the northern portion of the range of the genus and extending southward only at the higher altitudes. <i>A. ludens</i> can withstand freezing weather well, whereas in hot areas it may be killed by the heat of the sun (http://creatures.ifas.ufl.edu/fruit/tropical/mexican_fruit_fly.htm).”
Attitude (aggressive, etc.): “If it were to become established in southern California, Arizona, or Florida, it probably would cause heavier losses than it does in southern Texas because more kinds of host fruits are grown in these states than in southern Texas. This species is the only important member of the genus <i>Anastrepha</i> that is subtropical rather than tropical, occupying the northern portion of the range of the genus and extending southward only at the higher altitudes. <i>A. ludens</i> can withstand freezing weather well, whereas in hot areas it may be killed by the heat of the sun (http://creatures.ifas.ufl.edu/fruit/tropical/mexican_fruit_fly.htm).”
Physical Description: “Adult: The adult is slightly larger than a housefly and is mostly yellowish-brown in color. Somewhat lighter longitudinal markings occur on the thorax, especially noticeable on newly emerged flies. There is a small median dark brown spot on the posterior part of the mesothorax. The wings are transparent where they are not mottled and are striped with yellowish-brown bands. The inverted V on the lower part of the outer half of the wing typically is not connected at the tip and is not connected with the main pattern, thus distinguishing this species from several closely related species. The slender tube-like ovipositor sheath of the

female is longer than the remainder of the abdomen.

Larva: The larva is white with typical fruit fly larval shape (cylindrical, elongated, anterior end usually somewhat recurved ventrally and with mouth hooks, flattened caudal end, 8 ventral fusiform areas (1 indistinct - between the thorax and abdomen), 11 segments to body); last instars usually 9 to 12 mm in length. Anterior buccal carinae 12 to 14. Cephalo-pharyngeal skeleton with relatively large convex mouth hook (length 2 X width), with hypostome of nearly equal width; dorsal bridge enlarged; pharyngeal plate longer than dorsal wing plate and with a long pharyngeal support. Anterior spiracles slightly asymmetrical, with a median depression, usually 18 tubules present (rarely 12 to 18). Caudal end with paired dorsal (D1 & D2) and intermediate (I1 & I2) papillules, plus an indistinct I3; prominent L1 and V1; D1 & D2 acutely angled (ca. 45°) and as widely separated as I1 & I2; I1 & I2 less acutely angled (ca. 30°); I1, I3, and L1 approximately in a straight line (at ca. 30°) and I3 almost equidistant from L1 and I2. Posterior spiracles elongated (ca. 5 X width), with dorsal 2 angled upward and ventral one angled downward on each side of median; interspiracular processes (hairs) mostly branched distally. Anal lobe usually bifid, but sometimes entire (the anal lobe variation requires further study to determine if this represents 1 or 2 species, or a hybrid). [Described from USNM lot from Chihuahua, Mexico.] (http://creatures.ifas.ufl.edu/fruit/tropical/mexican_fruit_fly.htm)."

Management Recommendations / Control Strategies: include references for existing site-specific strategies

"The Sterile Insect Technique is used in maintaining a fly-free zone in Mexico, Texas and California. Technology for the eradication programs used to maintain these zones is supported by research by the USDA ARS laboratory in Weslaco, Texas, and Sanidad Vegetal laboratories in Mexico. Both research groups cooperate with APHIS Plant Protection and Quarantine and International Services departments in establishing protocols and executing sterile insect release programs.

Trapping is not a good method to estimate populations of this fruit fly. However, cutting fruit after harvest or late season is a good method of estimating populations. If a fly is trapped in an orchard, then all fruit from that orchard is quarantined for two weeks. More sterile flies are released in the area. If a second wild fly is found than the quarantine is extended for a year. (Robacher 1993)

Quarantine

Continual detection, survey and eradication campaigns are being conducted in the cultivated citrus sections of northwestern Mexico, adjacent to California, and occasionally in the southern part of California when new invasions are detected. Sterilization of fruit before shipment from quarantined areas is required. Orange, sweet limes, grapefruit, mangos, sapotes, peaches, guavas, and plums are denied entry from Mexico into the United States by Federal Quarantine No. 5. Federal Quarantine No. 64 was enacted to prevent the shipment of certain fruits (mangos, sapotes, peaches, guavas, apples, pears, plums, quinces, apricots, mameys, ciruelas, and citrus fruits, except lemons and sour limes) from several counties in Texas to other parts of the country except under certification by the U.S. Department of Agriculture (http://creatures.ifas.ufl.edu/fruit/tropical/mexican_fruit_fly.htm)."

"[Federal Register: October 23, 2002 (Volume 67, Number 205)]

[Rules and Regulations]

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DEPARTMENT OF AGRICULTURE

Animal and Plant Health Inspection Service

7 CFR Parts 305 and 319

[Docket No. 98-030-4]

RIN 0579-AA97

Irradiation Phytosanitary Treatment of Imported Fruits and Vegetables

AGENCY: Animal and Plant Health Inspection Service, USDA.

ACTION: Final rule.

SUMMARY: We are establishing regulations providing for use of irradiation as a phytosanitary treatment for fruits and vegetables imported into the United States. The irradiation treatment provides protection against fruit flies and the mango seed weevil. This action provides an alternative to other currently approved treatments (various fumigation, cold, and heat treatments, and systems approaches employing techniques such as greenhouse growing) against fruit flies and the mango seed weevil in fruits and vegetables.

EFFECTIVE DATE: October 23, 2002 (<http://www.ceris.purdue.edu/napis/news02/fr021023.txt>)."

References (includes journals, agency/university reports, and internet links):

1. http://creatures.ifas.ufl.edu/fruit/tropical/mexican_fruit_fly.htm

2. Robacher, D., and R.L. Magan. 1993. ARS Program on *Anastrepha* species to meet APHIS Plant Quarantine requirements. University of Florida seminar.

3. <http://www.ceris.purdue.edu/napis/news02/fr021023.txt>. [Federal Register: October 23, 2002 (Volume 67, Number 205)]. [Rules and Regulations] [Page 65016-65029]

4. Baker, A.C., W.E. Stone, C.C. Plummer, and M. McPhail. 1944. A review of the Mexican fruitfly and related species. USDA Misc. Pub. No. 531, Washington, DC. 155 p.

5. Robacher, D., and R.L. Magan. 1993. ARS Program on *Anastrepha* species to meet APHIS Plant Quarantine requirements. University of Florida seminar.

Available Mapping Information:

<http://www.ceris.purdue.edu/napis/pests/ffmx/> as of December 23, 2002